Discriminant Function Analysis to Identify Predictor Variables of Pupil Teacher's Teaching Effectiveness in face to face and online classes

A

Synopsis

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Supervisor
Prof. N.P.S. Chandel
Dept. of Foundation of Education
Faculty of Education

Researcher
Anshika Trivedi

DEPT. OF FOUNDATION OF EDUCATION, FACULTY OF EDUCATION
DAYALBAGH EDUCATIONAL INSTITUTE (DEEMED UNIVERSITY)
DAYALBAGH, AGRA-282005
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Introduction

Teacher plays a vital role in society, in spite of high use of digital resources and social media. The education is obviously child centred but nursing of students is in the hand of teacher even now. Kothari Commission (1964-1966) states," the future of nations constructs in classroom". The students are future of nation and the teachers are constructor so the more students nurture the nation more. According to Ravindra Nath Tagore (as cited in Gill, M. S., 2014), "A lamp can never light another lamp unless it continues to burn its own flame: a teacher can never truly teach unless he is still learning himself". Teacher should elevate and refine their knowledge and teaching effectiveness time to time. National Education Policy (2020) states that "Teachers must be grounded in Indian values, languages, knowledge, ethos, and traditions including tribal traditions, while also being well-versed in the latest advances in education and pedagogy." Teaching Effectiveness is specific concept which is important for both type of classes (online and offline).The main objective of teaching effectiveness is to achieve predefined aims of education in teaching. Assignation of teaching aim can be assessed by students output or learning, the more teaching will effective the more learning outcomes (Ward,Phillip;2014). Ogunyemi, (2000) argued that effective teaching goes beyond just imparting knowledge but it is a purposeful activity carried out by someone with a specialized knowledge in a skilful way to enhance the cognitive, affective and psychomotor development of a person or group of persons. It means teacher has understanding of their stsudents, classroom, teaching material, communication skills for, they can teach effectively and enhance their cognitive, affective and psychomotor domain. An effective teacher has a purposeful activity on this basis he can deliver best and achieve their objectives.

Teaching Effectiveness is a multidimensional phenomenon such as personality, teaching attitude, teaching aptitude, intelligence, self-efficacy, communication skills, digital skills, leadership, content knowledge, pedagogical knowledge, emotional intelligence, sensitivity and so on. The findings suggest that improvement of teaching effectiveness may depend more on changes related to personality factors (dynamic, pragmatic, amicable, and intellectual) than on those involving classroom procedures (Sherman,B.R.,& Blackburn R.T.;1975).classroom teaching behaviour mediates the relationship between personality and teaching effectiveness (Erde,S.Murray et. al;1985). The study

argued that emotional expressivity: an individual's skill in nonverbal communication, emotional sensitivity, an individual's skill in receiving and interpreting nonverbal communication of others, and Social Control, an individual's ability to engage others in social discourse, were related to teaching effectiveness among pre service teachers (Donald, L.Hasamm;1998). There are four factor of online teaching effectiveness such as active learning, student faculty interaction, time and task, cooperation among students (Arthur, W.Banget; 2006). Personality of teacher affects the teaching effectiveness (Othman,Binti Fauziah; 2009).). Qualification and teaching experience are positively correlate with teaching effectiveness (Tyagi, Shweta; 2013). The teachers become the intellectuals and encourage the attitude of the pupil teachers "self- efficacy" "hope" "optimism" and "resiliency" to promote the better teaching effectiveness.(Wong, J.H.;2014) .Teachers' self-efficacy and personality associated with teaching effectiveness (Klassen, Robert m. & Tze, Virginia m.c.;2014) .Emotional intelligence skills play an important role in teaching effectiveness and increase academic achievement of students (Hasan,Narehan;2015). Govt.-aided and Self-Financed B.Ed. college teacher educators differ significantly with respect to their teaching effectiveness and on most of the dimensions of teaching effectiveness, namely subject mastery, presentation style, motivational strategy, effective communication, student-teacher interaction, informal academic support and personal attribute (barman, pranab;2015). The author gave top tips for creating engaging and effective online teaching. The tips are -active learning, group effort, be present, parse your time, chunk the lesson, and multimedia assignment (Sharon, O' Malley; 2017).

Above to these researches, researcher found many variables which are the factors of teaching effectiveness.

In present time teacher training programme aims at preparing effective teacher in both type classroom conditions whether it is on line or face to face or some times blended. Large investments are made to prepare a teacher, even 2 years of training if a pupil teacher is not able to prove himself as an effective teacher, the entire investment of money and time made by the state, society, family and the individual will be wasted. Therefore, there is a need to predict the possibility of success in teaching effectiveness at the entry level will save the time and money of the aspirant and the institution.

Emergence of the Problem

Teacher should have theoretical as well as practical knowledge also. Training programme provides pupil teachers both the knowledge but some of them become successful teacher and remain are futile. Selection process of pupil teachers should be predictor of successful teacher. Different commissions and policies have given number of suggestions in context of selection procedure of pupil teachers.

National Education Commission (1964-1966): Recommended that students should have passed degree course for having admissions in training institutes and institutes should provide free training to attract able persons in this field.

Teacher Education Commission (1983-1985): Gave crucial recommendation in all fields of teacher education. It also focused on selection procedure of pupil teachers as "We find that trainees are generally selected on the basis of their performance at the school or the first degree level as the case may be, and an interview. In some B.Ed. colleges there are also written tests in addition. We are constrained to remark that selections are not being conducted with a kind of vigour they deserve because of political, social, personal influences operating in the field. Some of the characteristics to look for while selecting a teacher for training are: A good physique, linguistic ability and communication skills, a fair degree of general mental ability, general awareness of the world, A positive outlook on life and a capacity for good human relationships.''

Rammurti Review Committee (1990): Suggested that the selection process of pupil teacher depends upon attitude and academic achievement.

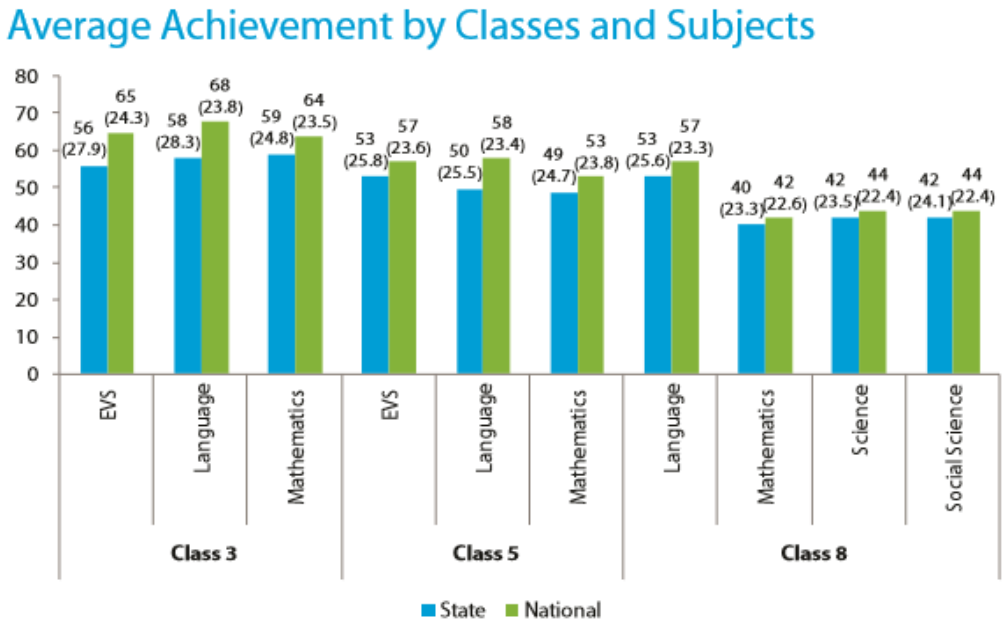
Janardan Reddy Committee (1992): Suggested to improve the admission process at every level of teacher training institution.

New Education Policy Draft (2019): Suggestions of New Education Policy Draft for admission of pre service teachers that "Admission to pre service teacher preparation programmes, like all higher educational institution admission, will be carried out in large part through subject and aptitude tests as conducted by the National Testing Agency. This is in keeping with the principal of separating Board examination from official university entrance examinations, the full criteria and process for admission will be left to the universities and colleges offering these programmes."

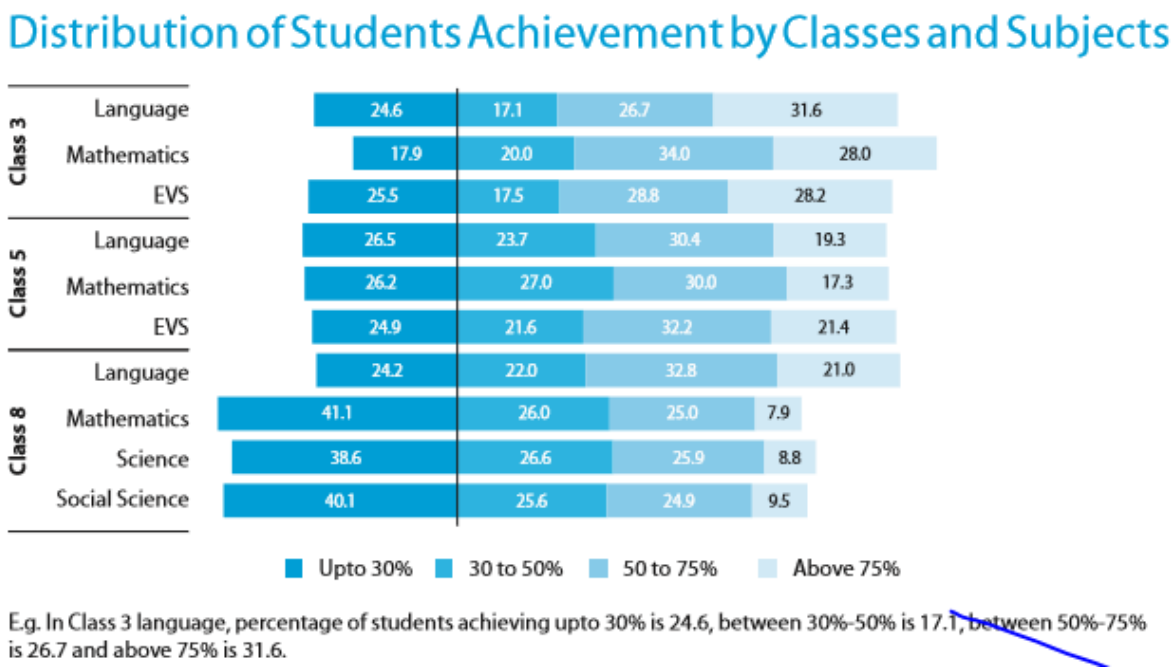
It is indent from above recommendation and suggestions that there is need to improve selection procedure of pupil teachers because this weakness hurdles effectiveness and working productively of the teachers and directly affects students' all aspect and achievement. It means the selection of pupil teacher is a saviour issue. It is necessary pay attention in to the selection of pupil teachers.

Jagran English Newspaper (8 February, 2020) reported that only 11.46% pupil teachers qualified Uttar Pradesh Teacher Eligibility Test, 2019 at secondary level. Jagran English Newspaper (29 October 2019) reported data on the applicants applied for the recruitment of trained graduate teachers or LT grade teachers in 2018 in which proposed posts were 10768 in 15 subjects and only 42% of the were filled because only this much no of candidates qualified the test. This data shows that after a long period of training, prospective teachers are still not able to qualify the standard of teacher selection criteria. If prospective teachers are scrutinized at the initial phase like at the selection time, then these types of problems would have not been faced at the placement phase of selection.

Report of National Achievement Survey (NAS) – The National Achievement Survey (NAS) was conducted throughout the country on November 13, 2017 for Classes 3rd, 5th and 8th in Government and Government-aided schools. Findings of the survey is presented as



National Achievement Survey (2017) Retrieved from http://www.ncert.nic.in/programmes/education_survey/index_education.html



National Achievement Survey (2017) Retrieved from http://www.ncert.nic.in/programmes/education_survey/index_education.html

As reported by National Achievement Survey (NAS) that, 24.2%, 41.1%, 38.6%, 40.1% students of class 8th scored less than 30% marks in Language, Maths, Science and Social Science subjects respectively.

After analysing the various commissions reports and recommendations, National Survey Report and newspaper data, the researcher drawn an inference that there are still some weaknesses exists at initial level of teacher education system which hinders the selecting criteria of an appropriate individual who has potential characteristic to be a teacher.

Mukminin, Amirul (2017) suggested that teaching practicum projects undertaken during the program provided suitable but limited experience for student teachers to translate their knowledgse learnt at university into the real practice of teaching at school levels. Anderse. Janis F.(2017)argued that Canonical correlation analysis produced one significant canonical relationship between specific and generalized teacher immediacy and teaching effectiveness. Swars, Susan Lee (2005);Mathematics teacher efficacy is positively correlated with teaching effectiveness. Moradi,Moein(2018);The study shows that the effectiveness of online instructional modules for providing complementary instruction in basic mathematics and physics concepts. Kusumlata, (2017) suggested that Teaching Aptitude are positively and significantly related to level of aspirations of prospective teachers. Rahaman,

Mostafijur(2018) found that there are no significant difference between male- female and urban- rural teacher's teaching effectiveness.

On the bases of above commission's recommendations, National Achievement Survey, newspaper data and researches shows serious problem in the field of selection process. Selection of variables of effective teaching. Present study emerged from these problems sensitized by the researcher.

Justification of the Study

Researcher reviewed several researches in area those pupil teachers who will be able to teach effectively after completion of the training programme is a big problem because no researches have done to identify the determinants or predictor

of pre service teaching programmes. Some researches such as: technical and vocational education students in Malaysia choose teaching as higher priority and the predictor variables of the study are motivational factor, perception, expectation, satisfaction (Bakar, et.al.2014). Teacher's occupational perceptions, principals' leadership styles, and a number of demographic characteristics are predicting their job satisfaction (Bogler. Ronit,2002). Teachers who plan to leave teaching and those who plan to stay can be reliably distinguished by the pattern of their work-related attitudes, perceptions, and reactions (Bruce, W.Hall et.al.1992). The predictor variable of the committed teachers are (1) personal characteristics (sex, personality); (2) initial motivation for teaching; (3) teacher education (type of teacher training, graduation degree, preparedness for teaching, faculty support and mentor support); and (4) integration into teaching (teacher efficacy and professional orientation) (Antonia, Aelterman & Rots, Isabel 2008). Those students who choose teaching career willingly whose predictor variables are academic achievement, family support, contribution of university preparation course and contribution of school (Hatice Kumandas, et al.2013). Instructors' teaching styles are relation with competences, self-efficacy, and commitment in pre-service teachers (Antonio Gonzalez et. al.2017). Intelligence, attitude toward teaching profession and academic achievement are the discriminate factors of different groups of teacher (Cornelius 2000). Teacher effectiveness is related to cognitive style and emotional competence of teacher. (Thakur, Meera 2017). To become a successful teacher, teacher should have teaching aptitude and positive attitude toward teaching (Roy, Himangshu & Chaturvedi, Kamna 2018).

Study support that teacher's communication skill and work motivation have a high influence in the teaching aspect and communication style can develop interest in learning (Duta, Nicoleta & Ion Ovidiu Panisoara 2015). A study suggested that time management is very important for a teacher so time management skill may be included in teacher training programme. (Hafiz Muhammad et. al. 2016). Self-concept and teacher effectiveness of secondary school teacher have significant relationship (Sawney, Sandeep 2015). Mukminin, Amirul (2017) suggested that teaching practicum projects undertaken during the program provided suitable but limited experience for student teachers to translate their knowledge learnt at university into the real practice of teaching at school levels. Anderse. Janis F.(2017)argued that Canonical correlation analysis produced one significant canonical relationship between specific and generalized teacher immediacy and teaching effectiveness. Swars, Susan Lee (2005) found that Mathematics teacher efficacy is positively correlated with teaching effectiveness. The study of Moradi,Moein(2018) shows that the effectiveness of online instructional modules for providing complementary instruction in basic mathematics and physics concepts. Kusumlata, (2017) suggested that Teaching Aptitude are positively and significantly related to level of aspirations of prospective teachers. Rahaman, Mostafijur(2018) found that there are no significant difference between male- female and urban- rural teacher's teaching effectiveness.

On the basis of above research, the researcher found that most of the work have done in the field of component or factors of teaching effectiveness but the area of predictor variables of teaching effectiveness have gaps. Present study will help in identifying those variables which can predict the teachers' teaching effectiveness on the basis of some discriminant variables. Teachers roles are changing in this techno- oriented world. The teacher is not only supposed to teach in face to phase mode but also in online mode using different digital platforms. A teacher whose teaching is effective in face to face mode may or may not be effective in online mode. Teaching effectiveness is a relative term one teacher whose teaching is effective in one condition may or may not be in other. Therefore, there is a need to study the teaching effectiveness in different conditions. Present research will be helpful in developing selection or entry level tests by providing list of variables to be measured in by such test. NEP 2020 is also suggesting that in order to maintain uniform standards for teacher education, the admission to pre-service teacher preparation programmes shall be through suitable

subject and aptitude tests conducted by the National Testing Agency, and shall be standardized keeping in view the linguistic and cultural diversity of the country. The problem of selection or right person for teaching profession may be solved if his or her teaching effectiveness can be predicted at the entry point of the teacher training programme. Researcher has some questions in her mind to find the above mentioned problem:

Research question

- Can effective and non-effective pupil teachers be discriminated on the basis of some predictor variables in online classroom?
- Which are predictor variables of pupil teacher's teaching effectiveness in online classroom?
- Can effective and non-effective pupil teachers be discriminated on the basis of some predictor variables in offline classroom
- Which are predictor variables of pupil teacher's teaching effectiveness in face to face classroom?

Statement of the Problem

Discriminant Function Analysis to Identify Predictor Variables of Pupil Teacher's Teaching Effectiveness in face to face and online classes.

Definition of the Term

- **Predictor Variable-** According to APA dictionary (2018) a variable used to estimate, forecast, or project future events or circumstances. In personal selection.
- **Pupil Teacher-** A student teacher who is studying to be a teacher and who, as part of the training, observes classroom instruction or does closely supervised teaching in an elementary or secondary school**.**
- **Teaching Effectiveness-** Omoniyi, (2005) asserted that effective teaching is those activities which bring about the most productive and beneficial learning experience for students and promotes their development as learners.
- **Discriminant analysis-** Dallas E. Johnson, (1998) defined that Discriminant analysis is similar to regression analysis except the dependent variable is categorical rather than

continuous. In regression, we want to be able to predict the value of a variable of interest based on a set of predictor variables. In discriminant analysis, we able to predict class membership of an individual based on a set of predictors.

Operational Definitions

- **Predictor variables**- predictors are those variables which can be used to discriminate between effective and ineffective pupil teacher in online and offline classroom. In this study predictor variables are; teaching aptitude, attitude toward teaching, previous academic achievement, intelligence, cognitive ability, self-concept, emotional adjustment, personality traits (introvert-extrovert), communication skill, socio- economic status, Attitude toward life, procrastination, General awareness.

Definitions	Operational Definitions
Attitude- Allport (1935) defined an attitude as "a mental and n eural state of readiness, organized through experienc e, exerting a directive or dynamic influence upon an individual's response to all objects and situations wi th which it is related".	Teaching Attitude- Teaching attitude is particular feeling toward teaching.
Aptitude- Bingham, W.V.D.(1937)."Aptitude is set of characteristic regarded as symptomatic of individual's ability of which one essential aspect is her readiness to develop an interest in exercising his ability.	Teaching Aptitude- Teaching aptitude of pupil teacher indicates the potential for developing in a teaching area with teacher training.
Academic Achievement-Academic Achievement represent performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environment specifically in school, college and university.	Previous Academic Achievement– previous academic achievement means pupil teacher's average percentage of qualifying examination and pre-qualifying public examination.
Intelligence- Woodwort and Marquis (1948) stated that intelligence means intellect put to use. It is the use of intellectual abilities for handling a situation or accomplishing the task.	Intelligence- intelligence is general mental capacity to learn, understand and make judgements or have opinions that are based analytic thinking.
Personality Traits –Soto C.J (2018) A personality trait is a characteristics pattern of thinking ,feeling , behaving that tends to be consistent over time and across relevant situations.	Personality Traits – Personality traits meaning introvert and extrovert characteristics of pupil teachers.
Communication Skill- Vein, Ndoloi (1998) contends that communication is the transactional process concerned with the creation, transmission, interpretation and use of information. Generally, effective communication involves the choice of the best communication channel for a specific purpose.	Communication Skill-communication skill means verbal and non-verbal communication skill in classroom.
Self Efficacy- Hopper, Elizabeth (2019).self-efficacy refers to an individual's confidence in their	Self Efficacy- self-efficacy refers to pupil teacher's confidence in their ability to

ability to complete a task or achieve a goal.	complete a task or achieve a goal.
Time Management- mindtool(2020) Time management is the process of organizing and planning how to divide your time between specific activities.	Time Management- Time management is the process of organizing and planning how to divide pupil teachers' time between specific activities.
Leadership skill- ward, Susan (2020) Leadership is the art of motivating a group of people to act toward achieving a common goal.	Leadership- Leadership is the art of motivating a group of student to act toward achieving a learning outcomes.
Organization skill- Greenwald, H. P. (2008). "a Body of individuals working under a defined system of rules, assignments procedures, and relationships designed to achieve identifiable objectives and goals."	Organization skill-"pupil teacher working under a defined education system of rules, assignments procedures, and relationships designed to achieve identifiable objectives and goals of education."

- **Pupil Teacher -** Pupil teacher means those students teachers studying in 2 years secondary level teacher education programme.
- **Teaching effectiveness-** Teaching Effectiveness means pupil teacher's effective teaching on the base of rating given by the supervisors, peer group and students.
- **Discriminant analysis**- Discriminant analysis means linear discriminant analysis.

Objectives of the Study

Following objectives have been formulated for the present study:

- To determine important predictor variables which are relatively significant discriminator between effective teachers and ineffective pupil teachers in online classroom.
- To develop a discriminant function with linear combination of predictor variables for discriminating both the categories of effective and ineffective teachers in online classroom.
- To determine important predictor variables which are relatively significant discriminator between effective teachers and ineffective pupil teachers in face to face classroom.
- To develop a discriminant function with linear combination of predictor variables for discriminating both the categories of effective and ineffective teachers in face to face classroom.

Hypotheses of the Study

In order to realize the above objectives of present study following hypotheses have been formulated:

H_1: Predictor variables will significantly discriminate between Effective and Ineffective teachers in face to face classroom.

H_2: Predictor variables will significantly discriminate between Effective and Ineffective teachers in online classroom. .

Delimitations of the Study

In order to make study more specific and methodical it has been delimited to following points:

1. Six institution running B.Ed course will be selected from U.P. State only.
2. Only B.Ed. second year students will be selected for study.
3. Sample will be limited to 300 pupil teachers only.

Methodology of the Study

The methodology of the study has been defined in the following heads:

Variables of the study

- Independent variables: predictor variables (teaching aptitude, attitude toward teaching, academic achievement, intelligence, self-efficacy, Introvert-extrovert, communication skill, time management skill, leadership, organization skill).
- Dependent variables: Teaching Effectiveness.

Sample of the study

The Sample selection in the present study will be done in three distinct stages as given below:

Stage 1: Selection of the Universities:

The researcher will use purposive method of sampling, for the selection of universities in the present study.

Stage 2: Selection of the Pupil Teacher:

In this stage of sampling, 300 pupil teachers will be selected using simple random sampling.

Method of the Study

Survey method of descriptive research will be used in present study. According to Kerlinger (1986)-"Survey research studies large and small population or universe by selecting and studying

sample chosen from the populations to discover the relative incidence, distribution and interrelation of sociological and psychological variables".

Tools of the study

Following tools will be used in the study:

1. Teaching attitude inventory by S.P. Ahluwalia (2006).
2. Test for general intelligence for college students by S.K. Pal and K.S. Mishra (2012).
3. Personality tool (CISLO) - Self-made (Communication skill, Introversion-Extroversion, Self-efficacy, Leadership, Organization).
4. Teaching effectiveness- self-made.
5. Teaching aptitude test battery by Dr. R.P Singh and S.N. Sharma (2005).

Statistical Technique:

Following statistical techniques will be used in the present study:

- Descriptive statistics:

1. Mean

2. Standard deviation

- Inferential statistics:

T-test, Correlation

F-test: To find appropriate significance of discriminate function researcher use f test.

BOX'M TEST: It is used to find the homogeneity of variance.

Wilks' lambda test: It is used to define significance of discriminate function.

Discriminate Analysis: Discriminate analysis is that statistical techniques which classify two specific group of any item, characteristics etc. The classified variables are called categorical variable and the function is developed by these variable is called discriminate function.

Significance of study

There is some significance of study:

- This study play significant role for all stake holder of teacher education.

- Selection of pupil teachers at input stage is important part of teacher education program. If is selects right person then the human resource, money resources will not go waste due to wrong selection.
- Prediction of eligible and effective teacher will also help employers .
- It is important for policy maker; they will use such type of researcher to make their selection procedure better.

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